Jackson Walker LLP

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May 4, 2016

Via Email and CM/RRR

U.S. EPA Region VI
Attn: Valmichael Leos
Remedial Project Manager
Mail Code: 65F-RA
1445 Ross Street
Dallas, TX 75202
Email Address: Leos.Valmichael@epa.gov

U.S. EPA Region VI
Attn: Marvin Benton
Senior Staff Attorney
Mail Code: 6RC-S
1445 Ross Street
Dallas, Texas 75202
Email Address: Benton.Marvin@epa.gov

Re: Notice of Project Coordinator and Contractor—Cedar Chemical Corporation Superfund Site ("Site")

Dear Messrs. Leos and Benton:

Consistent with the Administrative Settlement Agreement and Order on Consent for Remedial Investigation / Feasibility Study ("ASAOC") please find this notice from the Respondents in the above titled matter.

Pursuant to Paragraph 32 of the Consent Decree of the ASAOC please find the following information for the contractor selected by the Respondents.

Mark P. Hemingway, PG, BCES
Jim McDade, P.E.
GSI Environmental Inc. ("GSI")
9600 Great Hills Trail, Suite 350E
Austin, Texas 78759
Office 512-346-4474
mphemingway@gsienv.com
jmmcdade@gsi-net.com

GSI's Quality Management Plan is included herewith as **Exhibit A**. GSI's qualifications and work experience can be found at its website, http://www.gsi-net.com.

Further, Respondents intend to use the following subcontractors, consultants and laboratories:

Cascade Drilling
Clinton Herron
4885 East Shelby Drive
Memphis, TN 38118
(731) 445-8206

Cline-Frazier Consulting Engineers
728 Cherry Street
Helena, AR 72342
(870) 338-6550

Environmental Chemistry Services ("ECS")
Nancy Toole
10031 Doliver
Houston, TX 77042
(303) 850-7606

TestAmerica
Sachin Kudchadkar
6310 Rothway Street
Houston, TX 77040
(713) 690-4444

United States Environmental Services
3450 McCracken Road
Hernando, MS 38632
(662) 280-3232

Further, in accordance with Paragraph 33, GSI will also serve as Project Coordinator for the Respondents.

Please do not hesitate to contact me with any questions you may have.

Respectfully,

Daniel E. Vineyard

lcm:dev

cc: **Via Email**:
Lindsey Moorhead lmoorhead@jw.com
Mark Hemingway mphemingway@gsi-net.com
Jim McDade jmmcdade@gsi-net.com

Exhibit A

Quality Management Plan

16213695v.1

GSI ENVIRONMENTAL INC.

QUALITY MANAGEMENT PLAN

GSI Environmental Inc.

2211 Norfolk, Suite 1000, Houston, TX 77098-4054 ■ P: 713.522.6300 ■ 800.382.7858

9600 Great Hills Trail, Suite 350E, Austin, TX 78759 ■ P: 512.346.4474

4590 MacArthur Blvd., Suite 285, Newport Beach, CA 92660 ■ P: 949.679.1070

155 Grand Ave., Suite 704, Oakland, CA 94612 ■ P: 510.463.8484

Issued: 3 May 2016

GSI QUALITY MANAGMENT PLAN

APPROVALS

Signature: _____ Date: 03 May 2016

John A. Connor, P.E., P.G., BCEE
GSI Environmental Inc.
President

Signature: _____ Date: 03 May 2016

Robert S. Lee, P.G.
GSI Environmental Inc.
Vice President, Quality Assurance Manager

Approval for Implementation:

_____ _____

U.S. EPA Project Manager Date:

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LIST OF ACRONYMS

ANSI	American National Standards Institute
ASQC	American Society for Quality Control's
DQO	Data Quality Objective
EIT	Engineer in Training
EPA	Environmental Protection Agency
ESG	Engineer/Scientist/Geoscientist
CADD	Computer Aided Design and Drafting
FAR	Federal Acquisition Regulation
GIS	Geographic Information System
GIT	Geoscientist in Training
GSI	GSI Environmental Inc.
HAZWOPER	Hazardous Waste Operations
H.S.	High School
MSA	Master Services Agreement
OSHA	Occupational Safety and Health Administration
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QM	Quality Management
QMP	Quality Management Plan
PE	Project Engineer
PG	Project Geoscientist
PTL	Project Team Leader
SDS	Safety Data Sheet
SOP	Standard Operating Procedure
WBS	Work Breakdown Structure

1.0 MANAGEMENT AND ORGANIZATION

GSI Environmental Inc. (GSI) prepared this Quality Management Plan (QMP) in general accordance with the United States Environmental Protection Agency (EPA) Requirements for Quality Assurance Project Plans (EPA QA/R-2, EPA/240/B-01/002, March 2001) and Part A of the American National Standards Institute (ANSI)/American Society for Quality Control's (ASQC's) Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Programs (ANSI/ASQC E4-1994). This QMP identifies the mission, roles, and responsibilities of personnel with regard to quality assurance (QA), quality management (QM), communication structure, and measures of effectiveness at GSI.

The primary objective of this QMP is to ensure that all environmentally-related data collection and processing activities performed by or for GSI will result in data that are documented, of known quality, and can be used with a high degree of certainty by the intended user to support specific decisions or actions. To achieve this goal, GSI will be guided by the procedures outlined in this QMP as it plans for, collects, analyzes, and interprets environmental data. Additional guidelines that pertain to QA/QC are included within GSI's Employee Policy Manual and GSI's Procedures Manual.

1.1 Policy on Quality Assurance

GSI is committed to providing our clients with high quality products and services. We emphasize careful environmental data collection and analysis, and technical excellence in all of our work in order to provide solutions that are both efficient and effective. The quality of GSI's work product is the key to our success and the basis for our reputation among our clients and the regulatory community. The quality of GSI's work is reflected not only by consistency and accuracy, but also by tailoring the work program to fit the specific needs of each client and project, by presenting information and analysis in a concise and visually effective manner, by adding value from creative thinking and collaboration, and by ensuring that the final project deliverable is provided to the client on time and on budget.

It is GSI policy that all environmental data generated, processed, and used by GSI will be accurate and scientifically valid. Rigorous attention to quality assurance and quality control (QA/QC) is fundamental to every step of a project, including planning and budgeting, field data acquisition, laboratory analysis, data reduction, research and analysis, and preparation of the final deliverable. To implement this policy, GSI will ensure that each project use adequate QA procedures and will continually strive to evaluate and improve our QA efforts so that data meets the needs and expectations of our clients. Information produced by GSI, or on behalf of GSI by a contractor, will be reviewed prior to submittal for accuracy, consistency, and scientific validity.

The overall and most basic goals of this QMP are to ensure and improve quality, accuracy, and performance, comply with applicable standards, and maintain or increase customer satisfaction. This QMP also describes policies and procedures for implementing and assessing the ongoing effectiveness of this quality system. In our effort to improve the quality of our projects, the project quality review structure for each project also disseminates quality lessons learned to project staff.

Each employee is required to adhere to our QA/QC policies and procedures when preparing all documents for submittal to clients, regulatory agencies, and/or other third-party recipients. Upon starting work at GSI, all new employees are issued our policy and procedures manuals,

attend a new employee orientation, and sign an acknowledgment agreeing to abide by those policies as a condition of their employment. Policies and procedures manuals are updated periodically and distributed to all employees and key revisions are highlighted during staff meetings.

Each GSI work product, including, but not limited to, cost proposals, project reports (whether draft or final), technical memoranda, engineering drawings and calculations, and geoscience work products, must be reviewed and approved by the Project Team Leader (PTL) and/or Project Principal before it may be issued to a client, regulator, or other outside party. Major submittals and proposals require co-signature of a Project Principal.

Calculations must always be checked independently before they, and any subsequent analysis based upon them, are incorporated into a report or presented to the PTL for review. Calculation checks include ensuring the analysis includes appropriate application of correct formulas and when applicable that formulas have been properly verified.

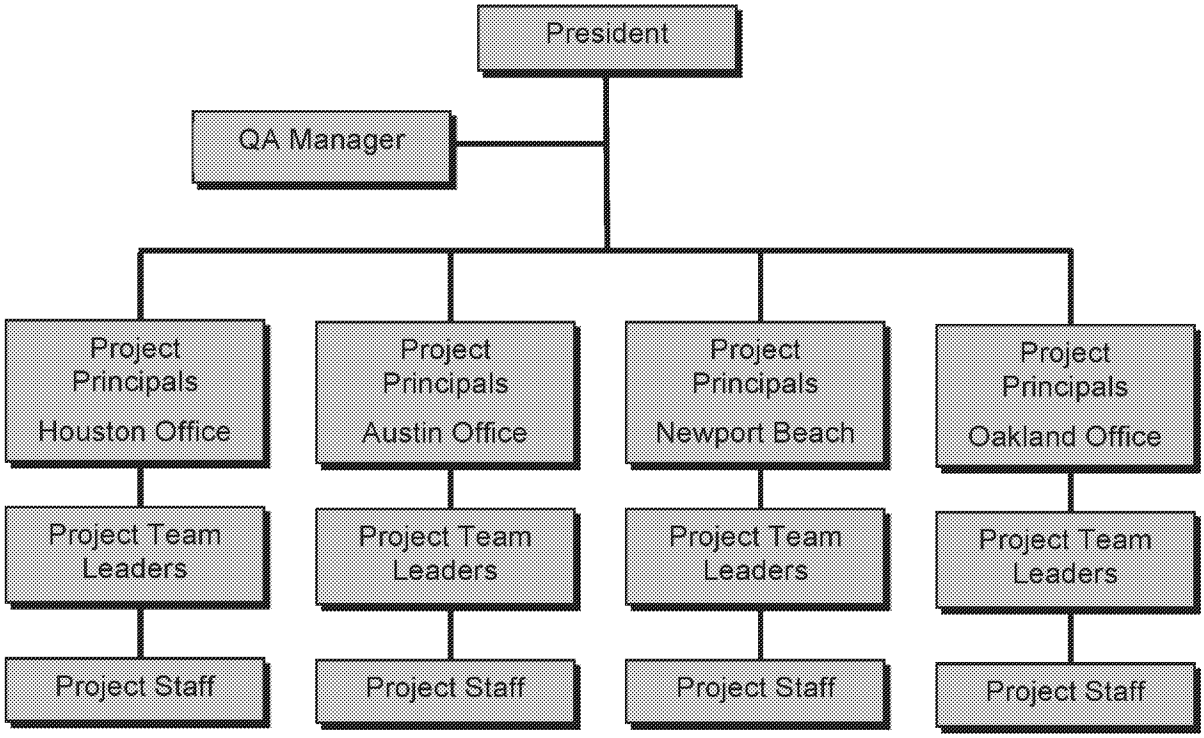
Work products requiring the seal of a licensed Professional Engineer (P.E.) or Professional Geoscientist (P.G.) must be sealed and signed only by the licensed P.E. or P.G. who performed the work or, as allowed by regulation, under whose direct oversight the work was performed. No employee may affix the P.G. of P.E. seal of another employee to any document.

1.2 Organizational Chart

The organizational chart below identifies the components of GSI and the organizational position and lines of reporting of our GSI's Quality Assurance Manager and staff.

Figure 1

GSI QA Organizational Chart



1.3 Authorities of the QA Managers and Other QA Staff

All persons on staff at GSI are responsible for ensuring the quality of our services and deliverables. GSI has an open door policy with regard to reporting any and all concerns. It is our objective to provide a work environment free from elements that would deter our staff from doing their best work. All staff are free to express themselves about work related or personal matters to all levels of management in order to plan, assess, and improve the organizations quality system.

Below are brief descriptions of the authorities of our QA Manager and QA staff.

- **President** *(John A. Connor, P.E., P.G., BCEE).* As GSI's President, Mr. Connor provides overall executive oversight and expert consulting to ensure successful and timely execution of projects. He can also provide final review and approval of critical deliverables prior to submittal.
- **Quality Assurance Manager** *(Robert S. Lee, P.G.).* GSI's Quality Assurance Manager is a Principal of GSI and is responsible for oversight, training, and adherence to all quality related requirements. Our QA Manager reports directly to our President. GSI's Quality Assurance Manager maintains GSI's Quality Management Plan and reviews Quality Assurance Project Plans (QAPPs). He also ensures compliance with local, state, and federal, regulations, and contract requirements. As a Project Principal, he also provides review of critical proposal and project deliverables prior to submittal.
- **Project Principals.** GSI's Project Principals provide executive oversight of the Project Team to ensure successful and timely execution of projects. Project Principals are responsible for final review and approval of all critical deliverables prior to submittal. The Project Principal is also responsible for identifying a PTL with the appropriate qualifications and experience to manage the work.
- **Project Team Leaders (PTLs).** PTLs are responsible for managing day-to-day coordination of projects and ensuring that each project meets the objectives and relevant quality standards. In addition, they are responsible for monitoring project budgets and schedules to ensure deliverables are completed on-time and on-budget. The PTL will report directly to the project-designated Project Principal to comply with quality standards. Other tasks associated with the PTL include serving as the primary point of contact between GSI and the Client or Stakeholder, managing day-to-day coordination with GSI Technical Staff and subcontractors, invoicing, maintaining the budget and the schedule, overseeing the preparation and submittal of required deliverables, and performing quality reviews on all deliverables developed by GSI technical advisors and staff.
- **GSI Technical Advisor**. When deemed necessary by the PTL or Project Principal, senior-level personnel with subject-matter expertise will provide assistance on specific issues related to the project. In order to ensure that the appropriate type and quality of data is being collected, the GSI Technical Advisor may review and provide input on work plans and reports generated by the PTL and Technical Staff during the project. Technical advisors will also be consulted in critical areas where proven and experienced technical support is needed.
- **Technical Staff.** GSI Technical Staff will report to the PTL and will assist with the execution and preparation of project tasks and deliverables. GSI Technical Staff will perform an initial quality review prior to submittal to PTL for review.

1.4 Technical Activities Supported by the QA System

GSI conducts a variety of technical activities that collect, generate or use environmental data, including but not limited to the following:

- Field work and field data acquisition
- Management and oversight of fieldwork subcontractors
- QA/QC review of laboratory analytical data
- Data analysis and development of reports
- Permitting and compliance activities
- Development and use of models
- Environmental risk assessments
- Feasibility studies
- Design, installation, and operation of remediation and monitoring systems
- Field and laboratory research and development projects
- Stormwater management projects
- Development and use of environmental databases
- Development of environmental software
- General environmental professional support

1.5 Communication

GSI's quality management system policies and procedures are reviewed during new hire orientation for all employees. In addition, GSI holds quarterly or more frequent meetings for the PTLs and technical staff to update and review QA/QC and health and safety requirements. Staff are encouraged to ask questions and/or voice concerns about the overall requirements or project-specific scenarios both during the meeting and privately.

For situations in which issues regarding quality assurance are in dispute, resolution should be sought at the project level. Should resolution not be reached at this level, the issue should be brought to the attention of the QA Manager. All parties should make every effort to resolve disputes through discussion and negotiation.

2.0 QUALITY SYSTEM COMPONENTS

This section outlines GSI's general QA/QC procedures as they pertain to implementation of the policy and achievement of the objectives described in Section 1.1.

At the beginning of each project, a management and review structure is identified to assure that data quality requirements are met. The project team determines the appropriate type, quantity, and quality of data, including data quality objectives (DQOs), to support the intended uses of the data.

A timeline is developed for deliverables and technical solutions. The appropriate technical personnel are assigned to review each phase of the project. Additional resources, including internal standards for graphics and figures and set GSI formats, are available for use and provide a template for maintaining a standard quality for deliverables. GSI uses a variety of other tools and practices in its quality system, including not limited to the following:

Quality Management Plan (QMP)

This QMP describes the general framework that GSI uses to maintain QA/QC for technical activities that involve collection, generation, or use of environmental data. This QMP is intended to be suitable for all types of projects that GSI typically performs. However, for some large projects or programs, there may be a need for a QMP that is more specific to certain technical areas. In those situations, a supplemental QMP can be developed.

Data Quality Objectives (DQOs)

Data Quality Objectives are qualitative and quantitative statements which clarify the study objectives, define the most appropriate types of data to collect, and specify of the performance or acceptance criteria of environmental data required to support decisions or actions.

Quality Assurance Project Plans (QAPPs)

As required on a project-by-project basis, GSI develops and implements QAPPs for its data collection activities. A QAPP describes the data quality objectives (DQOs) and outlines the field and laboratory procedures to be implemented in order to fulfill the project objectives. Each QAPP is reviewed by the Quality Assurance Manager or other qualified personnel and approved by the Project Principal.

Standard Operating Procedures (SOPs)

SOPs are documents that give a step-by-step description of routine procedures for data collection and documentation (e.g., groundwater sample collection). SOPs are developed by technical staff and approved by GSI management.

Sampling and Analysis Plans

Sampling and analysis plans document the plan for obtaining the data that meets the performance criteria, including number and location of required samples, analytical methods, and methods for collecting the samples.

Data Quality Assessments

A data quality assessment is evaluation of the data obtained during a project to determine if it is of the right type, quality, and quantity to support the intended use. Initial review of data from field sampling and testing programs includes: making sure that 1) all samples submitted for analysis were in fact analyzed, and within hold times, 2) that required detection levels were met, 3) duplicate results meet required RPDs, and 4) results make sense based on prior sampling, etc. Project staff conduct initial review of data quality. The quality of analytical data is initially reviewed by a qualified and experienced person at GSI. However, all formal data validation, verification and associated reports are produced by a qualified GSI subcontractor who specializes in data validation.

Third-Party and Historical Data QA/QC Review

When using data generated by others, particularly when the data are of a historical nature, the quality of the data must be documented and assessed relative to project DQOs to determine whether the data are of suitable quality for the intended use on the project or whether limitations on use or reliance may apply. If the original project report presenting the data and original laboratory reports are available, they will be reviewed for information on sample collection methodology, site conditions, data qualifiers and other pertinent factors. If the original project or lab reports are not available, their absence will be noted.

Quality Control Procedures listed in in the GSI Procedures Handbook

The Procedures Handbook includes a section on quality control regarding proposals and reports that applies to all GSI projects. The aspects of quality control that are discussed in the Handbook include:

- Process for review and approval of reports by GSI Principals,
- Responsibility of the staff to ensure technical quality and avoid careless errors, and
- Minimum actions required for all GSI work product, including proofreading, checking data and calculations, checking documents before they are issued to an outside party, and maintenance of physical and electronic file records.

All data tables, calculations, and figures are independently checked by a person other than the one who created them. Calculation checks include not only confirming that the math is correct, but also confirming that the appropriate formulas, equations and inputs were used.

3.0 PERSONNEL QUALIFICATION AND TRAINING

Table 1, on the following page, contains a general summary of GSI personnel categories, including the expectations of employees in each category. Each field personnel performing tasks potentially involving contact with affected soil and groundwater will have Occupational Safety and Health (OSHA) 40-hour Hazardous Waste Operations (HAZWOPER) training and annual 8-hour refresher updates. Technical staff involved in the project will be qualified based on education and experience and will conduct work/tasks under the direction of the PTL. If applicable, a Professional Geoscientist or Professional Engineer licensed in the relevant state will direct and maintain responsible charge of those aspects of work in accordance with relevant professional statutes and regulations. Subcontractors will have the proper certification and licenses in accordance with local and state guidelines.

Upon joining GSI, each employee is trained on GSI's quality control procedures and agrees in writing that they understand and will abide by these procedures. Whenever GSI modifies or clarifies these procedures, each affected employee receives the updated policy, is retrained, and agrees to the changes in writing.

Table 1

GSI Personnel Categories: 2016

Category	Qualifications/ Training	Expectations
Project Assistant	High School (H.S.) education or equivalent and 2 or more years related experience.	**Project Assistant** Perform assignments of confidential nature for functional groups and managers. Use technical and business vocabulary. Knowledge of organizational operations and procedures essential. Plan, organize, and schedule work within guidelines. Compile report documents. **Accounting Associate** Prepare draft invoices for billing, coordinate with project managers to review unbilled charges and finalize approved invoices. Perform accounts payable or receivable duties, support accounting specialists with general accounting needs and resolve vendor issues for project managers.
Researcher	Bachelor's degree and 10+ years of experience	**Researcher** Research available technical data including background information, drawings, design reports, equipment, and test specifications. Work with technical personnel to clarify document contents. Direct administrative staff on project assignments. Communicate frequently with work originators and vendor representatives. Prepare written text and coordinate layout and organization of documents according to prepared outlines and specifications. **Marketing Coordinator** Coordinate corporate business development/marketing support activities, including proposal process management, strategy and development, and resource allocation. Contribute to opportunity tracking and business development elements of revenue forecasting and proposal strategy development. Direct the writing, editing, and creative presentation for proposal sections. Provide client development support.
Accounting Specialist	Bachelor's degree in accounting or Associate's degree and 2 years of experience	Manage invoicing, cost coding, maintenance of bank accounts, general ledger maintenance, and financial statement preparation and review. Establish the billing terms of assigned contracts within the accounting system. Ensure all budgets, cash flows, and subcontract agreements for new contracts are appropriately documented and signed-off in accordance with company policies and procedures. Provide financial assistance/training to project managers and operations personnel.

Category	Qualifications/ Training	Expectations
Environmental Technician	H.S. graduate or equivalent and 2 years field services experience or Associate's degree	Execute field sampling and testing programs. Train and supervise field services technical staff. Order, maintain and control inventory of equipment, supplies, and facilities.
CADD/Graphics Specialist	H.S. graduate or equivalent with minimum of 10 years of experience or college graduate with minimum of 5 years of experience on the CADD system or as graphics specialist	**CADD Specialist** Prepare layouts and perform final Computer-Aided Design and Drafting (CADD) drafting tasks. Produce high quality figures with all critical details. Exhibit broad knowledge of CADD system. **Graphics Specialist** Produce high quality drafting and illustration products. Prepare layouts and final graphics.
GIS Specialist	Bachelor's degree in related field with minimum 5 years or Master's degree with minimum 2 years GIS experience. GIS Professional Certification preferred.	Develop, implement and support projects requiring Geographical Information System (GIS) work, including customized user interfaces and automation processes using web-based applications. Maintain, acquire, distribute, and ensure high quality GIS and other spatially-oriented data.
Database Specialist	Master's Degree in Computer Science or related field. Minimum of 5 years of network and/or database administration	Review, evaluate, design, implement and maintain environmental databases. Use database management concepts, storage and query/retrieval methods, statistical analyses, and programming languages to perform analyses, develop plans and recommendations, and prepare required level of documentation. Comply with project specifications, including format and content of input/output data and functions to be performed by computer programs. Prepare clear and accurate tables, data plots, maps and other graphics.
Computer Programmer	H.S. graduate or equivalent with minimum of 10 years of experience or college graduate with minimum 5 years of experience in computer programming	Develop or modify software based on detailed specifications. Code, test, debug software and related operating systems.
Engineer/ Scientist/ Geoscientist (ESG) I	Bachelor's degree in engineering or science 40-hour OSHA HAZWOPER training	Perform engineering, geologic, and scientific tasks in various environmental fields. Work on engineering designs, prepare reports, construct plans, apply specifications, and develop cost estimates for various projects. Use educational background to develop calculations, apply scientific principles, and assess geologic / hydrogeologic conditions. Implement health and safety plan and serve as field safety officer. Oversee field activities of environmental technicians and subcontracted field personnel.

Category	Qualifications/ Training	Expectations
ESG II	Bachelor's degree with 3-5 years of experience or Master's degree with 1-3 years of experience. Engineer in Training (EIT) or Geoscientist in Training (GIT) registrations 40-hour OSHA HAZWOPER training 8-hour OSHA HAZWOPER Supervisor Training	**Technical:** Perform work involving conventional types of engineering, geologic and scientific principles. Evaluate, select, and apply standard techniques, procedures, and criteria to projects. Meet clear and specified objectives for assignments. Investigate limited number of variables. Use educational background and technical experience to coordinate technical tasks with other disciplines on projects. **Managerial:** Coordinate field and laboratory programs with client and subcontractors. Prepare site-specific health and safety plans; serve as project safety officer. Assist supervisors with preparation of proposals including development of scopes of work and budgets. Perform subcontractor oversight including solicitation and review of technical and cost proposals from subcontractors; review subcontractor invoices for accuracy and approval.
ESG III	Bachelor's degree with 5-10 years of experience. Master's degree with 3-7 years of experience. PhD with 1-5 years of experience. EIT or GIT registrations 40-hour OSHA HAZWOPER training 8-hour OSHA HAZWOPER Supervisor Training	**Technical:** Identify appropriate procedures and perform complex assignments on environmental projects. Prepare geological reports and maps, interpret research data, and provide recommendations for further study or action. Apply technical knowledge to conditions that affect planning, design, construction, and operation of environmental projects. Make recommendations to senior staff based on interpretation of data. **Managerial:** Manage communications with clients and subcontractors regarding project work scopes and budgets, project schedules, health and safety matters. Delegate and oversee report development, plans, and specifications of a project to subordinate engineers, geologists, subcontractors, and other employees. Assist management in training of staff and review and oversight of ESG I and II work products.
ESG IV	Bachelor's degree with 10-15 years of experience. Master's degree with 7-12 years of experience. PhD with 5-8 years of experience. Appropriate professional registration (PE, PG, etc.) 40-hour OSHA HAZWOPER training 8-hour OSHA HAZWOPER Supervisor	**Technical:** Perform work requiring a high degree of technical originality and ingenuity. Adapt and extend principles and techniques in areas of specialty to projects of major scope and importance. Review work to determine conformity with previously outlined objectives, interpret project requirements and specifications, and enforce adherence. **Managerial:** Plan, organize, and evaluate the technical scopes of engineers, scientists, technicians, and administrative resources on mid-size projects. Assist with management and training of technical staff and review and oversight of subordinate work products. Participate in business development initiatives with senior level staff and

Category	Qualifications/ Training	Expectations
	Training	Principals.
Senior ESG I	Bachelor's degree with 15-20 years of experience. Master's degree with 12-15 years of experience. PhD with 10-12 years of experience. Appropriate professional registration (PE, PG, etc.) 40-hour OSHA HAZWOPER training 8-hour OSHA HAZWOPER Supervisor Training	**Technical:** Recommend engineering, physical sciences and related programs to accomplish the objectives of the company. Select technical approaches, plan and organize projects, and interpret and analyze technical results as a recognized authority. **Managerial:** Supervise work of engineering and geologist supervisors. Manage multiple projects and provide technical oversight for project leaders. Initiate business development efforts for new and existing clients.
Senior ESG II	Bachelor's degree with 20+ years of experience. Master's degree with 15+yrs experience. PhD with 12+ years of experience. Appropriate professional registration (PE, PG, etc.) 40-hour OSHA HAZWOPER training 8-hour OSHA HAZWOPER Supervisor Training	**Technical Strength in Practice Area:** Make decisions and recommendations that have far-reaching impact on extensive engineering, scientific and related activities of the company. Plan, organize, and guide extensive environmental programs and activities. **Management of Multiple Projects:** Select the approaches, plan and organize resources, and interpret results. Supervise overall project management of company critical programs. **Client Service Management:** Perform functions such as communication, identification and pursuit of follow-on opportunities, and achievement of client success factors. **Leadership/ Personnel Development:** Provide oversight and mentoring of technical managers. **Business Development:** Initiate business development efforts for new and existing clients.
Senior Associate	Bachelors degree with 25+ yrs experience. Masters degree with 20+yrs experience. PhD with 15+ yrs experience. PE/PG registration or licensing, as applicable.	**Technical Strength in Practice Area:** Recognized subject matter expert within the industry. Play lead role in expansion of GSI business into new and established practice areas. Provide technical leadership to GSI project teams engaged in unique, highly complex, or otherwise technically challenging projects. Provide training and technology transfer for GSI staff. **Client Service Management:** Support principals' client service management with high-level technical expertise. **Leadership/ Personnel Development:** Provide training and technology transfer for GSI staff. **Business Development:** Identify new potential business opportunities based on emerging trends in

Category	Qualifications/ Training	Expectations
		science, technology and or regulatory matters.
Principal	Senior ESG or above	Responsible for the professional, technical, and administrative activities of the company. Develop long-range plans; provide effective leadership; and develop and recommend corporate objectives, goals, and budgets. Negotiate critical and controversial issues with officers of other organizations and companies. Take responsibility for a large segment of the company in an area of specialization.

4.0 DESCRIPTION OF PURCHASING SYSTEM (PROCUREMENT OF ITEMS AND SERVICES)

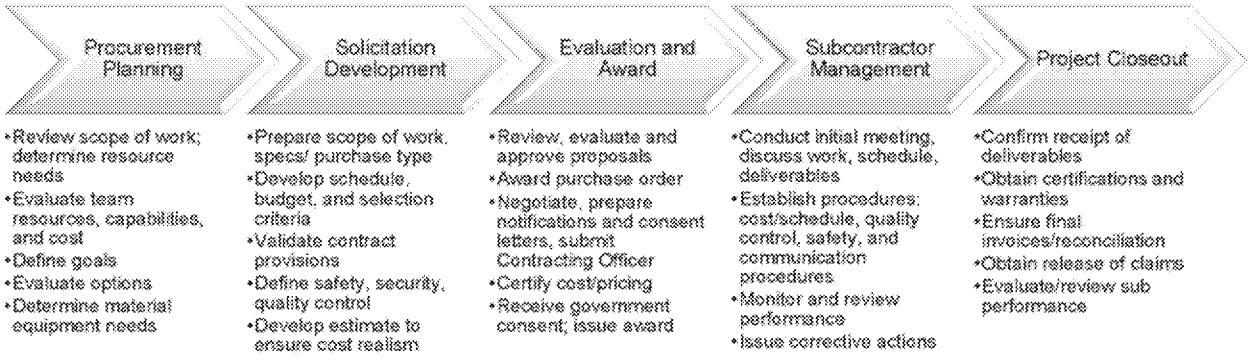
GSI's purchasing system is structured to streamline equipment, supplies, materials, and labor resource procurements in accordance with the Federal Acquisition Regulation (FAR) while ensuring that cost, schedule, technical, and data quality requirements are achieved. The system provides maximum flexibility to accommodate acquisitions of varying types, levels of complexity, and cost, as well as the ability to quickly respond to changing requirements and make adjustments to achieve timely delivery. To ensure compliance with regulations governing procurement under Federal Government contracts, all purchasing is performed in accordance with GSI procurement guidelines. These procurement guidelines are described below.

4.1 Acquisition and Control of Resources (Equipment, Supplies, Material, and Labor)

To cost-effectively procure resources to support projects, GSI applies standardized procedures to acquire equipment, services, and materials. These procedures are implemented by experienced GSI staff and include clearly defined authorities and approval limits. Our procurement organization and procedures for each phase of the acquisition process are outlined in Figure 2 and described below.

Figure 2

Procurement Planning and Procedures



4.2 Procurement Process and Approval

For each project the Project Principal and/or PTL evaluate the scope of work to identify the type and quantity of resources needed to perform the work. The PTL will select the best method of procurement and evaluate project objectives, funding, schedule, work sequencing, and acquisition strategies. Using a project work breakdown structure (WBS) approach as the framework, the PTL will identify work packages and conduct a make-buy analysis to determine the best-value approach for the work. The PTL will develop the procurement plan to obtain resources and review financial/technical requirements of work packages to ensure they are appropriately sized and scoped with accurate costs. To ensure GSI provides the best value to the client, subcontracts best suited to the complexity/duration of the work, degree of responsibility, and level of uncertainty and risk will be used.

The Principal and PTL have sole authority for the purchase of materials and/or services for their projects. The PTL may exercise or delegate procurement authority as appropriate to achieve the budget, scheduling, and quality objectives of the project and the client. In general, the purchase of small items (e.g., less than $100) in the field that are needed to conduct or expedite field work does not require the specific approval of the PTL, unless the PTL has requested such purchases be specifically approved.

Procurement of goods and services for some GSI projects may be subject to terms in our contract with the client. As examples, subcontractors may be required to submit prequalification information or to agree in writing to applicable contract provisions (e.g., "flow-down" provisions), in addition to standard GSI requirements outlined in a GSI Subcontract Agreement. It is the responsibility of the PTL to address such requirements and ensure compliance so as not to impact project schedule and budget. The PTL consults with the project Principal, as needed, to identify conditions applicable to a specific contract.

4.3 Assurance of Resource Availability

GSI will leverage our resource base, proven procurement techniques, and our management experience to ensure availability of resources when required. GSI has Master Service Agreements (MSAs) in place with rental companies, staffing agencies, suppliers, equipment fabricators, and firms providing commodity services, such as analytical laboratories, drillers, and surveyors.

4.4 Achieving Competition and Best Value

GSI implements competitive procedures as part of our general procurement practices. Our standard practice for Federal contracts is to solicit a minimum of three bids for a transaction, with the exception of sole/single source acquisitions, as defined by FAR Part 6, or acquisitions at or below the micro-purchase threshold (currently $3500, with limited exceptions). Private sector contracts may require competitive bids from vendors or service providers on a case-by-case basis (e.g., when required by client contracts or for larger projects); however, competitive bidding may be waived if the client specifies a provider, or there is an established GSI contractor with a history of demonstrated technical competence and cost-effectiveness for a similar scope of work, particularly where expedited turn-around is required. GSI achieves best-value procurement by controlling risk, conducting pre-project planning, implementing timely communication, and providing effective field management. GSI has used this best-value approach on cost reimbursable and firm fixed price contracts, resulting in an optimum combination of a fair and reasonable price, and performance excellence. The following evaluation criteria are part of our process:

- Past performance in safety, quality, schedule, cost;
- Relevant experience/qualifications;
- Technical and technological capabilities;
- Institutional and/or project/site knowledge;
- Adequacy of staffing and other resources; and
- Financial resources and total life-cycle costs.

4.5 Management of Subcontractors

The procurement of subcontracted services typically requires the execution of a GSI Subcontract Agreement and Work Order between GSI and the subcontractor. One exception is

procurement of laboratory analytical services. Laboratories must have the appropriate certifications and established protocols and SOPs for the services they will perform, but in most cases, laboratory testing is managed as a vendor-supplied service and a GSI Subcontract Agreement is usually not required.

The PTL is responsible for processing any GSI Subcontract Agreements. Specific services are generally authorized by a Work Order issued by GSI under the terms of the GSI Subcontract Agreement. Less formal authorizations may be used in some cases, but should be supported by proper documentation (e.g., at a minimum, an email or other written documentation outlining the authorized scope and costs). No subcontractor may engage in fieldwork on any client site without an executed Subcontract Agreement, including appropriate insurance coverage. Subcontract services of limited scope and not entailing fieldwork by individuals may be conducted under a professional services contract.

To clearly define roles and responsibilities for ensuring effective subcontractor management, GSI has established the following:

Principal:

- Responsible for overall contract performance;
- Oversees subcontract administration and award process; and
- Ensures program resource needs are met (internal and external sources).

Project Team Lead:

- Reviews site activity against subcontractor agreements, commitment reports, and invoices;
- Ensures subcontractors and vendors fully understand their responsibilities, cost, schedule, and performance requirements;
- Directs review meetings to monitor status of procurement activities, equipment, material, and resource equipment;
- Provides direction, training, and tools to enhance subcontractor performance and defines expectations in areas such as data submittal, reporting, and cost/invoice submittal;
- Reviews and implements change orders (upon client approval);
- Prepares alternate work procedures and issues corrective actions;
- Manages day-to-day project performance and compliance with project and quality objectives;
- Coordinates and maintains records of subcontractor documents;
- Administers changes and leads negotiations;
- Administers and handles disputes in contractual provisions;
- Processes changes and claims, as required; and
- Assures compliance with Federal (e.g., FAR) and client-specific requirements.

On-Site Field Lead

- Integrates subcontractor work with other site work;
- Conducts daily/weekly meetings and plans ahead for efficient work integration;
- Interacts with subcontractor field supervisor(s) for resource utilization and work performance, including Health and Safety Plans;
- Ensures all materials and equipment meet contract and quality requirements; and
- Tracks and documents daily subcontractor activities and delivery of goods and services.

GSI uses a partnering approach with subcontractors to ensure that they are involved in the project planning process and to obtain a clear understanding of the impact their performance has on project cost and schedule requirements. A documented review of subcontractors' performance is conducted on a regular basis to ensure effective integration and coordination of subcontractor activities during project execution.

Each subcontractor is required to submit information to support our earned value process, and GSI validates those submissions through review of work performed and through our quality control processes. At the project status meetings, the PTL reviews cost and schedule performance data with each subcontractor to determine if progress is satisfactory or if corrective action is needed to achieve project objectives. GSI further controls subcontractor performance through the following techniques:

- Selects the most appropriate subcontract form (e.g. Firm Fixed Price, Cost Plus Firm Fee) to deliver best value to the client (e.g. federal, private-sector);
- Develops work packages with measurable activities aligned to the work breakdown structure and performance baseline so performance can be monitored on a daily basis;
- Establishes clear lines of communication and reporting, and clearly defined roles and responsibilities of personnel to avoid misunderstandings or work overlap;
- Reviews work to ensure compliance with scope, budget, and schedule;
- Conducts earned-value analyses to assess cost and schedule performance;
- Monitors Health and Safety procedures and practices to ensure compliance;
- Conducts quality control inspections to evaluate work quality and identifies any deficiencies so that corrective actions are implemented immediately;
- Ensures subcontractors attend project scheduling meetings to discuss submittals, scope, schedule, and upcoming tasks; and
- Provides timely attention to performance problems and uses proven techniques to minimize changes.

4.6 Supplies and Consumables

Supplies and consumables (e.g., sample bottles, personal protective equipment, etc.) will be procured from a reputable manufacturer. For all chemicals purchased, a Safety Data Sheet (SDS) will be provided.

The On-Site Field Lead or designated On-Site Subcontractor will be responsible for checking all supplies and consumables to ensure that such materials have not been damaged and are in good working condition. If the On-Site Field Lead or designated On-Site Subcontractor determines that supplies or consumables are damaged or not usable (e.g., broken sample bottles, cracks in sample lids or chemical packaging, etc.), then they will dispose of such supplies or consumables appropriately and inform the GSI PTL of the damage. The GSI PTL will be responsible for either re-ordering supplies or consumables or authorizing the designated On-Site Subcontractor to re-order supplies or consumables.

5.0 DOCUMENT AND RECORDS POLICY

GSI requires each final deliverable and submission to our clients to meet our quality standards. All projects, proposals, and reports must be reviewed and approved by a GSI Principal. Proofreading, calculation and data checking, document checks, and file maintenance are each part of the quality control system implemented by GSI.

Our document and record policy ensures compliance with all applicable statutory, regulatory, and EPA requirements for documents and records (EPA Order 2160 [EPA 1984] and EPA Directive 2100, Chapter 10 [EPA 1998]).

5.1 Roles and Responsibilities

Administrative Staff

The administrative staff is responsible for establishing and maintaining project files. The administrative staff is not responsible for discarding obsolete versions of documents unless so directed by the PTL. It is anticipated that the administrative staff will be able to determine which category is appropriate for the majority of project documents. Questions should be directed to the PTL.

Project Team Lead

The PTL (or person designated by the PTL) is responsible for periodic inspection of the project files and for ensuring that obsolete copies of documents (both paper and electronic versions) are discarded in a timely manner. Following completion of a job, the PTL is required to perform a final inspection of the file to ensure that it is in good order. Any problems with the project files should be discussed with administrative staff and corrected. This responsibility applies not only to new jobs, but to all jobs currently stored within the office.

5.2 Document and Record Control

GSI utilizes both paper and electronic recording media on projects and implements document control procedures that are consistent with GSI and client-specific requirements. For instance, hand-recorded data records will be taken with indelible ink, and changes to such data records will be made by drawing a single line through the error with an initial by the responsible person. Similar controls are in place for electronic records. The PTL maintains ultimate responsibility for any and all changes to records and documents.

Each project is assigned a sequential job number. Project records and documents are filed by job number and by marking all materials with the appropriate job number. For hardcopy records, pertinent project records go into the job file, including work plans, data collection forms, work authorizations, laboratory reports, telephone logs, field activity reports, site safety plans and records, boring logs, correspondence, etc. Job files and records should be organized into one of six categories. Table 2 details the file categories that should be maintained during and after the completion of a project.

Table 2

GSI Job File Categories

Category	Description
Proposals/Work Orders	Includes job proposals, estimated job costs spreadsheet, purchase order, scope change requests, and correspondence related to clarification of project budget. Also includes work orders to subcontractors.
Deliverables/Documents	Includes reports, letter reports, and other deliverables specified in the proposal. For bound reports filed on shelving, the job folder should contain, at a minimum, the title page, table of contents, and transmittal or cover letter, indicating to whom the document was distributed. Please note that obsolete drafts of documents are to be removed and discarded from the project file and from electronic storage.

Category	Description
Correspondence	Includes written correspondence (excluding project deliverables) between GSI, client, and/or third parties related to the project.
Notes	Includes phone notes, meeting notes, notes to file, and other miscellaneous project-related notes.
Field Records/Safety Records	Includes final signed copy of project Health and Safety Plan, daily site safety records, daily activity reports, and other daily field records. For large file projects, types of field records may be separated by type at the discretion of the project manager. Equipment use forms will be retained in the project invoicing file maintained in the accounting office.
Miscellaneous	Item not fitting any of the descriptions above.

5.3 Document Retention

When office storage capacity is exceeded, job files will periodically be moved to offsite storage. Project files will be retained a minimum of three years from the conclusion of the project. Prior to discarding any batches of project files, a memo will be circulated to allow PTLs to designate that specific project files be retained.

The following GSI guidelines should be considered when creating or determining whether to retain internal project documents (e.g., meeting notes, phone notes, emails, other miscellaneous notes, internal memos, etc.). These guidelines apply to both handwritten and electronic project documents.

- Use common sense.
- Only create or retain documents that serve a clear function as part of the project record
- Cite substantiating references whenever appropriate.
- Permanent project documents should be written and filed in an easily understood manner.
- Circulation of project documents will be limited to those individuals working on the project who will need the document as part of their work on the project.

As a general rule, many project emails and other notes are working documents that support the development of a final project report. Accordingly, project emails or other notes should not be retained unless they provide supporting information that is not otherwise included in the final report, computer job file, or project file.

5.4 Computer Job Files

GSI's quality system requires that all computer job files are stored on the GSI server, which is backed up daily. Employees who submit a final copy of anything should transfer the document(s) to the central repository. All electronic documents should have the job number in the file name and be filed in the appropriate folder(s). When a FINAL report is issued, any DRAFT copies should be replaced in the paper archive and the computer archive with the updated FINAL copy. Each component of the document and other relevant information will be transferred to the central file.

6.0 COMPUTER HARDWARE AND SOFTWARE

GSI's computer hardware and software policy ensures that applicable EPA requirements for information resources management are addressed (EPA Directive 2100 [EPA 1998]), including security and privacy requirements. To ensure network security, compatibility, warranty coverage, and compliance with user licensing requirements, all computer hardware and commercial software for use on GSI work must be procured through GSI's Information Technology specialists.

GSI has developed an extensive portfolio of software tools designed to aid the environmental professional. Many of our innovative software products have been created in conjunction with federal and state agencies and are used by industry and government organizations worldwide. As a result, GSI values high quality in not only hardware but software requirements for project implementation, environmental data evaluations, modeling, process controls of environmental technology systems, and data analysis and database storage. GSI maintains a Network Administrator and Backup Network Administrator on staff as the point of contacts for assistance with computer related issues and software.

6.1 Roles and Responsibilities

Network Administrators

Network Administrators are responsible for procuring, developing, installing, testing, using/handling, maintaining, controlling, and documenting computer hardware and software to ensure they meet technical and quality requirements and directives. Network Administrators act as the points-of-contact for all purchase orders for software and hardware to ensure they meet GSI requirements and comply with applicable contractual requirements and standards. After purchase of software and hardware, Network Administrators continue to assess and document the impact of changes to use requirements and/or performance to provide assistance and/or upgrades, as required.

7.0 PLANNING AND SCHEDULING

GSI has a systematic planning system for the collection of data and information to ensure the quality and quantity of information gathered complies with project objectives. This framework promotes communication among all organizations and individuals involved in the environmental program. Through this systematic planning process, the project team can develop acceptance or performance criteria for the quality of the data. The steps for the systematic planning process are outlined below and are the responsibility of the PTL.

- Identify the project schedule, resources, budget, milestones, and requirements
- Describe the project objectives
- Identify the type of data needed
- Identify constraints to data collection
- Determine the quality and quantity of the data needed
- Describe how, when, and where the data will be obtained
- Specify QA/QC activities to assess the quality performance criteria
- Describe methods for data analysis, evaluation, and assessment against the intended use of the data and the quality performance criteria

8.0 IMPLEMENTATION OF WORK PROCESSES

The GSI Standard Project Team Structure ensures the implementation of project tasks and objectives, and that required data and information is collected and processed in accordance with applicable project quality objectives. In accordance with project and contracting requirements, further breakdown of roles and responsibilities will be performed. These assigned roles include, but are not limited to, Quality Control Managers, Health and Safety Managers, and Field Team Leaders.

Principal
Responsible for overall project oversight, including scope and budget approval, contract execution, invoice review, staff assignments, technical guidance, and quality control oversight on draft and final reports. The Principal is also responsible for ensuring compliance with federal, state, and local regulations, and industry contract requirements and establishing management systems and logistics.

Project Team Lead
The PTL is responsible for scope and budget development, proposal preparation, subcontract and contract processing, project work orders, budget tracking, day-to-day project direction, client interface, data evaluation, draft and final report preparation, and project file creation and maintenance.

Project Team Staff (Field Quality Control, Field Team, Technical Advisors, Health and Safety)
The project staff provides technical and administrative expertise, including completion of each assigned project task. They assist in the development and implementation of site-specific Health and Safety Plans, work plans, and field activities.

9.0 ASSESSMENT AND RESPONSE

The GSI Project Principal is responsible for ensuring that the quality system for a given project is suitable to achieve project goals, and that the quality assessment program is implemented in a manner to ensure that those goals are met. The following assessment tools, as applicable, may be utilized for this purpose: quality system audits, management systems reviews, peer reviews, technical reviews, performance evaluations, data quality assessments, readiness reviews, technical systems audits, and surveillance. Suitability and quality assessment reviews include the following processes:

- Assessing the adequacy of the quality system at least annually;
- Planning, implementing, documenting and reporting assessment results to management, including how to select an assessment tool, the expected frequency of their application to environmental programs, and the roles and responsibilities of assessors;
- Determining the level of competence, experience, and training necessary to ensure that personnel conducting assessment are technically knowledgeable, have no real or perceived conflict of interest, and have no direct involvement or responsibility for the work being assessed;
- Ensuring that personnel conducting assessments have sufficient authority and access to programs, managers, documents, and records, as well as the organizational freedom to:

  – Identify both quality problems and noteworthy practices,

  - Determine the root cause(s) of deficiencies or other problems,
  - Propose recommendations for resolving quality problems, and
  - Independently confirm implementation and effectiveness of solutions;
- Ensuring management's review and response to findings;
- Identifying how and when corrective actions are to be taken in response to the findings of the assessment, ensuring corrective actions are made promptly, and confirming the implementation and effectiveness of any corrective action; and
- Addressing any disputes encountered as a result of assessments.

Results of the assessment process will be shared with the project team and subcontractors, as necessary. If any changes to the quality system are required, the GSI PTL will be responsible for any corrective actions.

10.0 QUALITY IMPROVEMENT

Continuous quality improvement leads to the development of a better and more responsive quality system. At GSI, each employee is encouraged to provide feedback to the Principal and PTL regarding quality improvements. Meetings are held with technical staff and may include the representatives from stakeholders and/or contractors to exchange ideas and identify new ways to accomplish tasks and produce better products. GSI PTLs are responsible for ensuring that ideas and recommendations for improvement in the QA process are captured and documented. The Principal is responsible for ensuring that recommended program changes are given due consideration, and if acceptable, approved and implemented.

For individual projects, the PTL is responsible for reviewing on an on-going basis and ensuring that all recommended changes are integrated into the QA process. Any significant new additions or changes in the QA process must be recorded, as appropriate, and incorporated into the QMP or project-specific QAPPs, as applicable.

The PTL and Technical Staff identify adverse conditions or concerns on an on-going basis. After considerations and discussions, corrective actions are implemented immediately. Corrective actions will identify the causes of the problem(s), determine if the problem(s) is (are) unique or have more generic implications, and recommend procedures to prevent reoccurrence of identified problems. The Project Principal is responsible for ensuring that corrective actions have been implemented and are effective in preventing reoccurrence of any additional problems.

If standard operating procedures need revision, the appropriate procedure will be rewritten and shared with impacted staff members. If necessary, additional QA training will be scheduled.

Issued: 3 May 2016

GSI QUALITY MANAGMENT PLAN

APPROVALS

Signature: _____ Date: 03 May 2016

John A. Connor, P.E., P.G., BCEE
GSI Environmental Inc.
President

Signature: _____ Date: 03 May 2016

Robert S. Lee, P.G.
GSI Environmental Inc.
Vice President, Quality Assurance Manager

Approval for Implementation:

_____ _____

U.S. EPA Project Manager Date:

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LIST OF ACRONYMS

ANSI	American National Standards Institute
ASQC	American Society for Quality Control's
DQO	Data Quality Objective
EIT	Engineer in Training
EPA	Environmental Protection Agency
ESG	Engineer/Scientist/Geoscientist
CADD	Computer Aided Design and Drafting
FAR	Federal Acquisition Regulation
GIS	Geographic Information System
GIT	Geoscientist in Training
GSI	GSI Environmental Inc.
HAZWOPER	Hazardous Waste Operations
H.S.	High School
MSA	Master Services Agreement
OSHA	Occupational Safety and Health Administration
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QM	Quality Management
QMP	Quality Management Plan
PE	Project Engineer
PG	Project Geoscientist
PTL	Project Team Leader
SDS	Safety Data Sheet
SOP	Standard Operating Procedure
WBS	Work Breakdown Structure

1.0 MANAGEMENT AND ORGANIZATION

GSI Environmental Inc. (GSI) prepared this Quality Management Plan (QMP) in general accordance with the United States Environmental Protection Agency (EPA) Requirements for Quality Assurance Project Plans (EPA QA/R-2, EPA/240/B-01/002, March 2001) and Part A of the American National Standards Institute (ANSI)/American Society for Quality Control's (ASQC's) Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Programs (ANSI/ASQC E4-1994). This QMP identifies the mission, roles, and responsibilities of personnel with regard to quality assurance (QA), quality management (QM), communication structure, and measures of effectiveness at GSI.

The primary objective of this QMP is to ensure that all environmentally-related data collection and processing activities performed by or for GSI will result in data that are documented, of known quality, and can be used with a high degree of certainty by the intended user to support specific decisions or actions. To achieve this goal, GSI will be guided by the procedures outlined in this QMP as it plans for, collects, analyzes, and interprets environmental data. Additional guidelines that pertain to QA/QC are included within GSI's Employee Policy Manual and GSI's Procedures Manual.

1.1 Policy on Quality Assurance

GSI is committed to providing our clients with high quality products and services. We emphasize careful environmental data collection and analysis, and technical excellence in all of our work in order to provide solutions that are both efficient and effective. The quality of GSI's work product is the key to our success and the basis for our reputation among our clients and the regulatory community. The quality of GSI's work is reflected not only by consistency and accuracy, but also by tailoring the work program to fit the specific needs of each client and project, by presenting information and analysis in a concise and visually effective manner, by adding value from creative thinking and collaboration, and by ensuring that the final project deliverable is provided to the client on time and on budget.

It is GSI policy that all environmental data generated, processed, and used by GSI will be accurate and scientifically valid. Rigorous attention to quality assurance and quality control (QA/QC) is fundamental to every step of a project, including planning and budgeting, field data acquisition, laboratory analysis, data reduction, research and analysis, and preparation of the final deliverable. To implement this policy, GSI will ensure that each project use adequate QA procedures and will continually strive to evaluate and improve our QA efforts so that data meets the needs and expectations of our clients. Information produced by GSI, or on behalf of GSI by a contractor, will be reviewed prior to submittal for accuracy, consistency, and scientific validity.

The overall and most basic goals of this QMP are to ensure and improve quality, accuracy, and performance, comply with applicable standards, and maintain or increase customer satisfaction. This QMP also describes policies and procedures for implementing and assessing the ongoing effectiveness of this quality system. In our effort to improve the quality of our projects, the project quality review structure for each project also disseminates quality lessons learned to project staff.

Each employee is required to adhere to our QA/QC policies and procedures when preparing all documents for submittal to clients, regulatory agencies, and/or other third-party recipients. Upon starting work at GSI, all new employees are issued our policy and procedures manuals,

attend a new employee orientation, and sign an acknowledgment agreeing to abide by those policies as a condition of their employment. Policies and procedures manuals are updated periodically and distributed to all employees and key revisions are highlighted during staff meetings.

Each GSI work product, including, but not limited to, cost proposals, project reports (whether draft or final), technical memoranda, engineering drawings and calculations, and geoscience work products, must be reviewed and approved by the Project Team Leader (PTL) and/or Project Principal before it may be issued to a client, regulator, or other outside party. Major submittals and proposals require co-signature of a Project Principal.

Calculations must always be checked independently before they, and any subsequent analysis based upon them, are incorporated into a report or presented to the PTL for review. Calculation checks include ensuring the analysis includes appropriate application of correct formulas and when applicable that formulas have been properly verified.

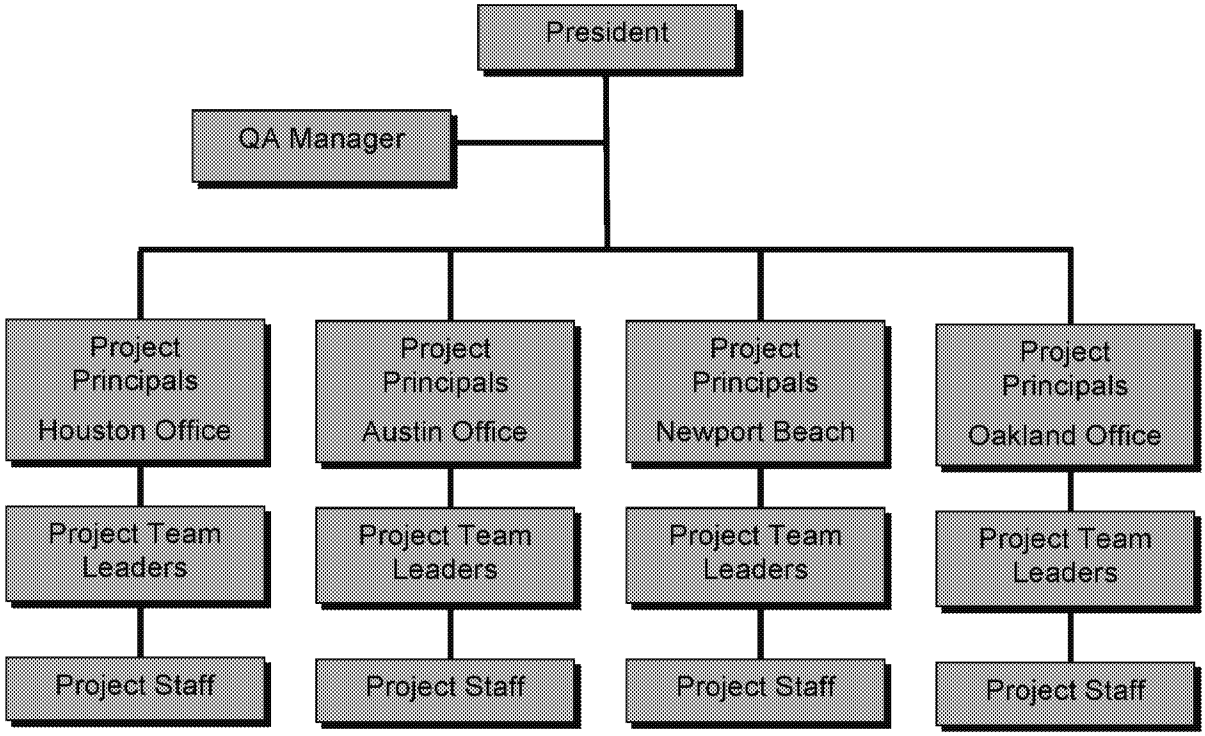
Work products requiring the seal of a licensed Professional Engineer (P.E.) or Professional Geoscientist (P.G.) must be sealed and signed only by the licensed P.E. or P.G. who performed the work or, as allowed by regulation, under whose direct oversight the work was performed. No employee may affix the P.G. of P.E. seal of another employee to any document.

1.2 Organizational Chart

The organizational chart below identifies the components of GSI and the organizational position and lines of reporting of our GSI's Quality Assurance Manager and staff.

Figure 1

GSI QA Organizational Chart



1.3 Authorities of the QA Managers and Other QA Staff

All persons on staff at GSI are responsible for ensuring the quality of our services and deliverables. GSI has an open door policy with regard to reporting any and all concerns. It is our objective to provide a work environment free from elements that would deter our staff from doing their best work. All staff are free to express themselves about work related or personal matters to all levels of management in order to plan, assess, and improve the organizations quality system.

Below are brief descriptions of the authorities of our QA Manager and QA staff.

- **President** *(John A. Connor, P.E., P.G., BCEE).* As GSI's President, Mr. Connor provides overall executive oversight and expert consulting to ensure successful and timely execution of projects. He can also provide final review and approval of critical deliverables prior to submittal.
- **Quality Assurance Manager** *(Robert S. Lee, P.G.).* GSI's Quality Assurance Manager is a Principal of GSI and is responsible for oversight, training, and adherence to all quality related requirements. Our QA Manager reports directly to our President. GSI's Quality Assurance Manager maintains GSI's Quality Management Plan and reviews Quality Assurance Project Plans (QAPPs). He also ensures compliance with local, state, and federal, regulations, and contract requirements. As a Project Principal, he also provides review of critical proposal and project deliverables prior to submittal.
- **Project Principals.** GSI's Project Principals provide executive oversight of the Project Team to ensure successful and timely execution of projects. Project Principals are responsible for final review and approval of all critical deliverables prior to submittal. The Project Principal is also responsible for identifying a PTL with the appropriate qualifications and experience to manage the work.
- **Project Team Leaders (PTLs).** PTLs are responsible for managing day-to-day coordination of projects and ensuring that each project meets the objectives and relevant quality standards. In addition, they are responsible for monitoring project budgets and schedules to ensure deliverables are completed on-time and on-budget. The PTL will report directly to the project-designated Project Principal to comply with quality standards. Other tasks associated with the PTL include serving as the primary point of contact between GSI and the Client or Stakeholder, managing day-to-day coordination with GSI Technical Staff and subcontractors, invoicing, maintaining the budget and the schedule, overseeing the preparation and submittal of required deliverables, and performing quality reviews on all deliverables developed by GSI technical advisors and staff.
- **GSI Technical Advisor**. When deemed necessary by the PTL or Project Principal, senior-level personnel with subject-matter expertise will provide assistance on specific issues related to the project. In order to ensure that the appropriate type and quality of data is being collected, the GSI Technical Advisor may review and provide input on work plans and reports generated by the PTL and Technical Staff during the project. Technical advisors will also be consulted in critical areas where proven and experienced technical support is needed.
- **Technical Staff.** GSI Technical Staff will report to the PTL and will assist with the execution and preparation of project tasks and deliverables. GSI Technical Staff will perform an initial quality review prior to submittal to PTL for review.

1.4 Technical Activities Supported by the QA System

GSI conducts a variety of technical activities that collect, generate or use environmental data, including but not limited to the following:

- Field work and field data acquisition
- Management and oversight of fieldwork subcontractors
- QA/QC review of laboratory analytical data
- Data analysis and development of reports
- Permitting and compliance activities
- Development and use of models
- Environmental risk assessments
- Feasibility studies
- Design, installation, and operation of remediation and monitoring systems
- Field and laboratory research and development projects
- Stormwater management projects
- Development and use of environmental databases
- Development of environmental software
- General environmental professional support

1.5 Communication

GSI's quality management system policies and procedures are reviewed during new hire orientation for all employees. In addition, GSI holds quarterly or more frequent meetings for the PTLs and technical staff to update and review QA/QC and health and safety requirements. Staff are encouraged to ask questions and/or voice concerns about the overall requirements or project-specific scenarios both during the meeting and privately.

For situations in which issues regarding quality assurance are in dispute, resolution should be sought at the project level. Should resolution not be reached at this level, the issue should be brought to the attention of the QA Manager. All parties should make every effort to resolve disputes through discussion and negotiation.

2.0 QUALITY SYSTEM COMPONENTS

This section outlines GSI's general QA/QC procedures as they pertain to implementation of the policy and achievement of the objectives described in Section 1.1.

At the beginning of each project, a management and review structure is identified to assure that data quality requirements are met. The project team determines the appropriate type, quantity, and quality of data, including data quality objectives (DQOs), to support the intended uses of the data.

A timeline is developed for deliverables and technical solutions. The appropriate technical personnel are assigned to review each phase of the project. Additional resources, including internal standards for graphics and figures and set GSI formats, are available for use and provide a template for maintaining a standard quality for deliverables. GSI uses a variety of other tools and practices in its quality system, including not limited to the following:

Quality Management Plan (QMP)

This QMP describes the general framework that GSI uses to maintain QA/QC for technical activities that involve collection, generation, or use of environmental data. This QMP is intended to be suitable for all types of projects that GSI typically performs. However, for some large projects or programs, there may be a need for a QMP that is more specific to certain technical areas. In those situations, a supplemental QMP can be developed.

Data Quality Objectives (DQOs)

Data Quality Objectives are qualitative and quantitative statements which clarify the study objectives, define the most appropriate types of data to collect, and specify of the performance or acceptance criteria of environmental data required to support decisions or actions.

Quality Assurance Project Plans (QAPPs)

As required on a project-by-project basis, GSI develops and implements QAPPs for its data collection activities. A QAPP describes the data quality objectives (DQOs) and outlines the field and laboratory procedures to be implemented in order to fulfill the project objectives. Each QAPP is reviewed by the Quality Assurance Manager or other qualified personnel and approved by the Project Principal.

Standard Operating Procedures (SOPs)

SOPs are documents that give a step-by-step description of routine procedures for data collection and documentation (e.g., groundwater sample collection). SOPs are developed by technical staff and approved by GSI management.

Sampling and Analysis Plans

Sampling and analysis plans document the plan for obtaining the data that meets the performance criteria, including number and location of required samples, analytical methods, and methods for collecting the samples.

Data Quality Assessments

A data quality assessment is evaluation of the data obtained during a project to determine if it is of the right type, quality, and quantity to support the intended use. Initial review of data from field sampling and testing programs includes: making sure that 1) all samples submitted for analysis were in fact analyzed, and within hold times, 2) that required detection levels were met, 3) duplicate results meet required RPDs, and 4) results make sense based on prior sampling, etc. Project staff conduct initial review of data quality. The quality of analytical data is initially reviewed by a qualified and experienced person at GSI. However, all formal data validation, verification and associated reports are produced by a qualified GSI subcontractor who specializes in data validation.

Third-Party and Historical Data QA/QC Review

When using data generated by others, particularly when the data are of a historical nature, the quality of the data must be documented and assessed relative to project DQOs to determine whether the data are of suitable quality for the intended use on the project or whether limitations on use or reliance may apply. If the original project report presenting the data and original laboratory reports are available, they will be reviewed for information on sample collection methodology, site conditions, data qualifiers and other pertinent factors. If the original project or lab reports are not available, their absence will be noted.

Quality Control Procedures listed in in the GSI Procedures Handbook

The Procedures Handbook includes a section on quality control regarding proposals and reports that applies to all GSI projects. The aspects of quality control that are discussed in the Handbook include:

- Process for review and approval of reports by GSI Principals,
- Responsibility of the staff to ensure technical quality and avoid careless errors, and
- Minimum actions required for all GSI work product, including proofreading, checking data and calculations, checking documents before they are issued to an outside party, and maintenance of physical and electronic file records.

All data tables, calculations, and figures are independently checked by a person other than the one who created them. Calculation checks include not only confirming that the math is correct, but also confirming that the appropriate formulas, equations and inputs were used.

3.0 PERSONNEL QUALIFICATION AND TRAINING

Table 1, on the following page, contains a general summary of GSI personnel categories, including the expectations of employees in each category. Each field personnel performing tasks potentially involving contact with affected soil and groundwater will have Occupational Safety and Health (OSHA) 40-hour Hazardous Waste Operations (HAZWOPER) training and annual 8-hour refresher updates. Technical staff involved in the project will be qualified based on education and experience and will conduct work/tasks under the direction of the PTL. If applicable, a Professional Geoscientist or Professional Engineer licensed in the relevant state will direct and maintain responsible charge of those aspects of work in accordance with relevant professional statutes and regulations. Subcontractors will have the proper certification and licenses in accordance with local and state guidelines.

Upon joining GSI, each employee is trained on GSI's quality control procedures and agrees in writing that they understand and will abide by these procedures. Whenever GSI modifies or clarifies these procedures, each affected employee receives the updated policy, is retrained, and agrees to the changes in writing.

Table 1

GSI Personnel Categories: 2016

Category	Qualifications/ Training	Expectations
Project Assistant	High School (H.S.) education or equivalent and 2 or more years related experience.	**Project Assistant** Perform assignments of confidential nature for functional groups and managers. Use technical and business vocabulary. Knowledge of organizational operations and procedures essential. Plan, organize, and schedule work within guidelines. Compile report documents. **Accounting Associate** Prepare draft invoices for billing, coordinate with project managers to review unbilled charges and finalize approved invoices. Perform accounts payable or receivable duties, support accounting specialists with general accounting needs and resolve vendor issues for project managers.
Researcher	Bachelor's degree and 10+ years of experience	**Researcher** Research available technical data including background information, drawings, design reports, equipment, and test specifications. Work with technical personnel to clarify document contents. Direct administrative staff on project assignments. Communicate frequently with work originators and vendor representatives. Prepare written text and coordinate layout and organization of documents according to prepared outlines and specifications. **Marketing Coordinator** Coordinate corporate business development/marketing support activities, including proposal process management, strategy and development, and resource allocation. Contribute to opportunity tracking and business development elements of revenue forecasting and proposal strategy development. Direct the writing, editing, and creative presentation for proposal sections. Provide client development support.
Accounting Specialist	Bachelor's degree in accounting or Associate's degree and 2 years of experience	Manage invoicing, cost coding, maintenance of bank accounts, general ledger maintenance, and financial statement preparation and review. Establish the billing terms of assigned contracts within the accounting system. Ensure all budgets, cash flows, and subcontract agreements for new contracts are appropriately documented and signed-off in accordance with company policies and procedures. Provide financial assistance/training to project managers and operations personnel.

Category	Qualifications/ Training	Expectations
Environmental Technician	H.S. graduate or equivalent and 2 years field services experience or Associate's degree	Execute field sampling and testing programs. Train and supervise field services technical staff. Order, maintain and control inventory of equipment, supplies, and facilities.
CADD/Graphics Specialist	H.S. graduate or equivalent with minimum of 10 years of experience or college graduate with minimum of 5 years of experience on the CADD system or as graphics specialist	**CADD Specialist** Prepare layouts and perform final Computer-Aided Design and Drafting (CADD) drafting tasks. Produce high quality figures with all critical details. Exhibit broad knowledge of CADD system. **Graphics Specialist** Produce high quality drafting and illustration products. Prepare layouts and final graphics.
GIS Specialist	Bachelor's degree in related field with minimum 5 years or Master's degree with minimum 2 years GIS experience. GIS Professional Certification preferred.	Develop, implement and support projects requiring Geographical Information System (GIS) work, including customized user interfaces and automation processes using web-based applications. Maintain, acquire, distribute, and ensure high quality GIS and other spatially-oriented data.
Database Specialist	Master's Degree in Computer Science or related field. Minimum of 5 years of network and/or database administration	Review, evaluate, design, implement and maintain environmental databases. Use database management concepts, storage and query/retrieval methods, statistical analyses, and programming languages to perform analyses, develop plans and recommendations, and prepare required level of documentation. Comply with project specifications, including format and content of input/output data and functions to be performed by computer programs. Prepare clear and accurate tables, data plots, maps and other graphics.
Computer Programmer	H.S. graduate or equivalent with minimum of 10 years of experience or college graduate with minimum 5 years of experience in computer programming	Develop or modify software based on detailed specifications. Code, test, debug software and related operating systems.
Engineer/ Scientist/ Geoscientist (ESG) I	Bachelor's degree in engineering or science 40-hour OSHA HAZWOPER training	Perform engineering, geologic, and scientific tasks in various environmental fields. Work on engineering designs, prepare reports, construct plans, apply specifications, and develop cost estimates for various projects. Use educational background to develop calculations, apply scientific principles, and assess geologic / hydrogeologic conditions. Implement health and safety plan and serve as field safety officer. Oversee field activities of environmental technicians and subcontracted field personnel.

Category	Qualifications/ Training	Expectations
ESG II	Bachelor's degree with 3-5 years of experience or Master's degree with 1-3 years of experience. Engineer in Training (EIT) or Geoscientist in Training (GIT) registrations 40-hour OSHA HAZWOPER training 8-hour OSHA HAZWOPER Supervisor Training	**Technical:** Perform work involving conventional types of engineering, geologic and scientific principles. Evaluate, select, and apply standard techniques, procedures, and criteria to projects. Meet clear and specified objectives for assignments. Investigate limited number of variables. Use educational background and technical experience to coordinate technical tasks with other disciplines on projects. **Managerial:** Coordinate field and laboratory programs with client and subcontractors. Prepare site-specific health and safety plans; serve as project safety officer. Assist supervisors with preparation of proposals including development of scopes of work and budgets. Perform subcontractor oversight including solicitation and review of technical and cost proposals from subcontractors; review subcontractor invoices for accuracy and approval.
ESG III	Bachelor's degree with 5-10 years of experience. Master's degree with 3-7 years of experience. PhD with 1-5 years of experience. EIT or GIT registrations 40-hour OSHA HAZWOPER training 8-hour OSHA HAZWOPER Supervisor Training	**Technical:** Identify appropriate procedures and perform complex assignments on environmental projects. Prepare geological reports and maps, interpret research data, and provide recommendations for further study or action. Apply technical knowledge to conditions that affect planning, design, construction, and operation of environmental projects. Make recommendations to senior staff based on interpretation of data. **Managerial:** Manage communications with clients and subcontractors regarding project work scopes and budgets, project schedules, health and safety matters. Delegate and oversee report development, plans, and specifications of a project to subordinate engineers, geologists, subcontractors, and other employees. Assist management in training of staff and review and oversight of ESG I and II work products.
ESG IV	Bachelor's degree with 10-15 years of experience. Master's degree with 7-12 years of experience. PhD with 5-8 years of experience. Appropriate professional registration (PE, PG, etc.) 40-hour OSHA HAZWOPER training 8-hour OSHA HAZWOPER Supervisor	**Technical:** Perform work requiring a high degree of technical originality and ingenuity. Adapt and extend principles and techniques in areas of specialty to projects of major scope and importance. Review work to determine conformity with previously outlined objectives, interpret project requirements and specifications, and enforce adherence. **Managerial:** Plan, organize, and evaluate the technical scopes of engineers, scientists, technicians, and administrative resources on mid-size projects. Assist with management and training of technical staff and review and oversight of subordinate work products. Participate in business development initiatives with senior level staff and

Category	Qualifications/ Training	Expectations
	Training	Principals.
Senior ESG I	Bachelor's degree with 15-20 years of experience. Master's degree with 12-15 years of experience. PhD with 10-12 years of experience. Appropriate professional registration (PE, PG, etc.) 40-hour OSHA HAZWOPER training 8-hour OSHA HAZWOPER Supervisor Training	**Technical:** Recommend engineering, physical sciences and related programs to accomplish the objectives of the company. Select technical approaches, plan and organize projects, and interpret and analyze technical results as a recognized authority. **Managerial:** Supervise work of engineering and geologist supervisors. Manage multiple projects and provide technical oversight for project leaders. Initiate business development efforts for new and existing clients.
Senior ESG II	Bachelor's degree with 20+ years of experience. Master's degree with 15+yrs experience. PhD with 12+ years of experience. Appropriate professional registration (PE, PG, etc.) 40-hour OSHA HAZWOPER training 8-hour OSHA HAZWOPER Supervisor Training	**Technical Strength in Practice Area:** Make decisions and recommendations that have far-reaching impact on extensive engineering, scientific and related activities of the company. Plan, organize, and guide extensive environmental programs and activities. **Management of Multiple Projects:** Select the approaches, plan and organize resources, and interpret results. Supervise overall project management of company critical programs. **Client Service Management:** Perform functions such as communication, identification and pursuit of follow-on opportunities, and achievement of client success factors. **Leadership/ Personnel Development:** Provide oversight and mentoring of technical managers. **Business Development:** Initiate business development efforts for new and existing clients.
Senior Associate	Bachelors degree with 25+ yrs experience. Masters degree with 20+yrs experience. PhD with 15+ yrs experience. PE/PG registration or licensing, as applicable.	**Technical Strength in Practice Area:** Recognized subject matter expert within the industry. Play lead role in expansion of GSI business into new and established practice areas. Provide technical leadership to GSI project teams engaged in unique, highly complex, or otherwise technically challenging projects. Provide training and technology transfer for GSI staff. **Client Service Management:** Support principals' client service management with high-level technical expertise. **Leadership/ Personnel Development:** Provide training and technology transfer for GSI staff. **Business Development:** Identify new potential business opportunities based on emerging trends in

Category	Qualifications/ Training	Expectations
		science, technology and or regulatory matters.
Principal	Senior ESG or above	Responsible for the professional, technical, and administrative activities of the company. Develop long-range plans; provide effective leadership; and develop and recommend corporate objectives, goals, and budgets. Negotiate critical and controversial issues with officers of other organizations and companies. Take responsibility for a large segment of the company in an area of specialization.

4.0 DESCRIPTION OF PURCHASING SYSTEM (PROCUREMENT OF ITEMS AND SERVICES)

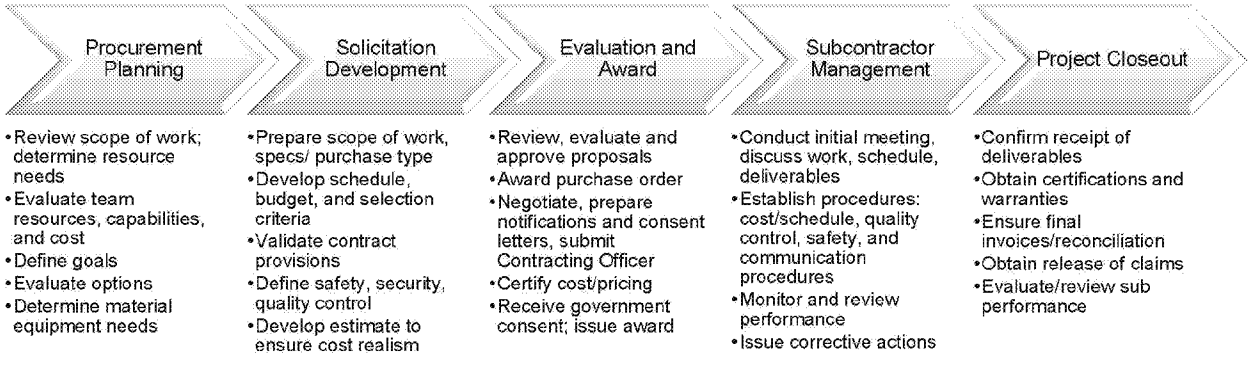
GSI's purchasing system is structured to streamline equipment, supplies, materials, and labor resource procurements in accordance with the Federal Acquisition Regulation (FAR) while ensuring that cost, schedule, technical, and data quality requirements are achieved. The system provides maximum flexibility to accommodate acquisitions of varying types, levels of complexity, and cost, as well as the ability to quickly respond to changing requirements and make adjustments to achieve timely delivery. To ensure compliance with regulations governing procurement under Federal Government contracts, all purchasing is performed in accordance with GSI procurement guidelines. These procurement guidelines are described below.

4.1 Acquisition and Control of Resources (Equipment, Supplies, Material, and Labor)

To cost-effectively procure resources to support projects, GSI applies standardized procedures to acquire equipment, services, and materials. These procedures are implemented by experienced GSI staff and include clearly defined authorities and approval limits. Our procurement organization and procedures for each phase of the acquisition process are outlined in Figure 2 and described below.

Figure 2

Procurement Planning and Procedures



4.2 Procurement Process and Approval

For each project the Project Principal and/or PTL evaluate the scope of work to identify the type and quantity of resources needed to perform the work. The PTL will select the best method of procurement and evaluate project objectives, funding, schedule, work sequencing, and acquisition strategies. Using a project work breakdown structure (WBS) approach as the framework, the PTL will identify work packages and conduct a make-buy analysis to determine the best-value approach for the work. The PTL will develop the procurement plan to obtain resources and review financial/technical requirements of work packages to ensure they are appropriately sized and scoped with accurate costs. To ensure GSI provides the best value to the client, subcontracts best suited to the complexity/duration of the work, degree of responsibility, and level of uncertainty and risk will be used.

The Principal and PTL have sole authority for the purchase of materials and/or services for their projects. The PTL may exercise or delegate procurement authority as appropriate to achieve the budget, scheduling, and quality objectives of the project and the client. In general, the purchase of small items (e.g., less than $100) in the field that are needed to conduct or expedite field work does not require the specific approval of the PTL, unless the PTL has requested such purchases be specifically approved.

Procurement of goods and services for some GSI projects may be subject to terms in our contract with the client. As examples, subcontractors may be required to submit prequalification information or to agree in writing to applicable contract provisions (e.g., "flow-down" provisions), in addition to standard GSI requirements outlined in a GSI Subcontract Agreement. It is the responsibility of the PTL to address such requirements and ensure compliance so as not to impact project schedule and budget. The PTL consults with the project Principal, as needed, to identify conditions applicable to a specific contract.

4.3 Assurance of Resource Availability

GSI will leverage our resource base, proven procurement techniques, and our management experience to ensure availability of resources when required. GSI has Master Service Agreements (MSAs) in place with rental companies, staffing agencies, suppliers, equipment fabricators, and firms providing commodity services, such as analytical laboratories, drillers, and surveyors.

4.4 Achieving Competition and Best Value

GSI implements competitive procedures as part of our general procurement practices. Our standard practice for Federal contracts is to solicit a minimum of three bids for a transaction, with the exception of sole/single source acquisitions, as defined by FAR Part 6, or acquisitions at or below the micro-purchase threshold (currently $3500, with limited exceptions). Private sector contracts may require competitive bids from vendors or service providers on a case-by-case basis (e.g., when required by client contracts or for larger projects); however, competitive bidding may be waived if the client specifies a provider, or there is an established GSI contractor with a history of demonstrated technical competence and cost-effectiveness for a similar scope of work, particularly where expedited turn-around is required. GSI achieves best-value procurement by controlling risk, conducting pre-project planning, implementing timely communication, and providing effective field management. GSI has used this best-value approach on cost reimbursable and firm fixed price contracts, resulting in an optimum combination of a fair and reasonable price, and performance excellence. The following evaluation criteria are part of our process:

- Past performance in safety, quality, schedule, cost;
- Relevant experience/qualifications;
- Technical and technological capabilities;
- Institutional and/or project/site knowledge;
- Adequacy of staffing and other resources; and
- Financial resources and total life-cycle costs.

4.5 Management of Subcontractors

The procurement of subcontracted services typically requires the execution of a GSI Subcontract Agreement and Work Order between GSI and the subcontractor. One exception is

procurement of laboratory analytical services. Laboratories must have the appropriate certifications and established protocols and SOPs for the services they will perform, but in most cases, laboratory testing is managed as a vendor-supplied service and a GSI Subcontract Agreement is usually not required.

The PTL is responsible for processing any GSI Subcontract Agreements. Specific services are generally authorized by a Work Order issued by GSI under the terms of the GSI Subcontract Agreement. Less formal authorizations may be used in some cases, but should be supported by proper documentation (e.g., at a minimum, an email or other written documentation outlining the authorized scope and costs). No subcontractor may engage in fieldwork on any client site without an executed Subcontract Agreement, including appropriate insurance coverage. Subcontract services of limited scope and not entailing fieldwork by individuals may be conducted under a professional services contract.

To clearly define roles and responsibilities for ensuring effective subcontractor management, GSI has established the following:

Principal:

- Responsible for overall contract performance;
- Oversees subcontract administration and award process; and
- Ensures program resource needs are met (internal and external sources).

Project Team Lead:

- Reviews site activity against subcontractor agreements, commitment reports, and invoices;
- Ensures subcontractors and vendors fully understand their responsibilities, cost, schedule, and performance requirements;
- Directs review meetings to monitor status of procurement activities, equipment, material, and resource equipment;
- Provides direction, training, and tools to enhance subcontractor performance and defines expectations in areas such as data submittal, reporting, and cost/invoice submittal;
- Reviews and implements change orders (upon client approval);
- Prepares alternate work procedures and issues corrective actions;
- Manages day-to-day project performance and compliance with project and quality objectives;
- Coordinates and maintains records of subcontractor documents;
- Administers changes and leads negotiations;
- Administers and handles disputes in contractual provisions;
- Processes changes and claims, as required; and
- Assures compliance with Federal (e.g., FAR) and client-specific requirements.

On-Site Field Lead

- Integrates subcontractor work with other site work;
- Conducts daily/weekly meetings and plans ahead for efficient work integration;
- Interacts with subcontractor field supervisor(s) for resource utilization and work performance, including Health and Safety Plans;
- Ensures all materials and equipment meet contract and quality requirements; and
- Tracks and documents daily subcontractor activities and delivery of goods and services.

GSI uses a partnering approach with subcontractors to ensure that they are involved in the project planning process and to obtain a clear understanding of the impact their performance has on project cost and schedule requirements. A documented review of subcontractors' performance is conducted on a regular basis to ensure effective integration and coordination of subcontractor activities during project execution.

Each subcontractor is required to submit information to support our earned value process, and GSI validates those submissions through review of work performed and through our quality control processes. At the project status meetings, the PTL reviews cost and schedule performance data with each subcontractor to determine if progress is satisfactory or if corrective action is needed to achieve project objectives. GSI further controls subcontractor performance through the following techniques:

- Selects the most appropriate subcontract form (e.g. Firm Fixed Price, Cost Plus Firm Fee) to deliver best value to the client (e.g. federal, private-sector);
- Develops work packages with measurable activities aligned to the work breakdown structure and performance baseline so performance can be monitored on a daily basis;
- Establishes clear lines of communication and reporting, and clearly defined roles and responsibilities of personnel to avoid misunderstandings or work overlap;
- Reviews work to ensure compliance with scope, budget, and schedule;
- Conducts earned-value analyses to assess cost and schedule performance;
- Monitors Health and Safety procedures and practices to ensure compliance;
- Conducts quality control inspections to evaluate work quality and identifies any deficiencies so that corrective actions are implemented immediately;
- Ensures subcontractors attend project scheduling meetings to discuss submittals, scope, schedule, and upcoming tasks; and
- Provides timely attention to performance problems and uses proven techniques to minimize changes.

4.6 Supplies and Consumables

Supplies and consumables (e.g., sample bottles, personal protective equipment, etc.) will be procured from a reputable manufacturer. For all chemicals purchased, a Safety Data Sheet (SDS) will be provided.

The On-Site Field Lead or designated On-Site Subcontractor will be responsible for checking all supplies and consumables to ensure that such materials have not been damaged and are in good working condition. If the On-Site Field Lead or designated On-Site Subcontractor determines that supplies or consumables are damaged or not usable (e.g., broken sample bottles, cracks in sample lids or chemical packaging, etc.), then they will dispose of such supplies or consumables appropriately and inform the GSI PTL of the damage. The GSI PTL will be responsible for either re-ordering supplies or consumables or authorizing the designated On-Site Subcontractor to re-order supplies or consumables.

5.0 DOCUMENT AND RECORDS POLICY

GSI requires each final deliverable and submission to our clients to meet our quality standards. All projects, proposals, and reports must be reviewed and approved by a GSI Principal. Proofreading, calculation and data checking, document checks, and file maintenance are each part of the quality control system implemented by GSI.

Our document and record policy ensures compliance with all applicable statutory, regulatory, and EPA requirements for documents and records (EPA Order 2160 [EPA 1984] and EPA Directive 2100, Chapter 10 [EPA 1998]).

5.1 Roles and Responsibilities

Administrative Staff

The administrative staff is responsible for establishing and maintaining project files. The administrative staff is not responsible for discarding obsolete versions of documents unless so directed by the PTL. It is anticipated that the administrative staff will be able to determine which category is appropriate for the majority of project documents. Questions should be directed to the PTL.

Project Team Lead

The PTL (or person designated by the PTL) is responsible for periodic inspection of the project files and for ensuring that obsolete copies of documents (both paper and electronic versions) are discarded in a timely manner. Following completion of a job, the PTL is required to perform a final inspection of the file to ensure that it is in good order. Any problems with the project files should be discussed with administrative staff and corrected. This responsibility applies not only to new jobs, but to all jobs currently stored within the office.

5.2 Document and Record Control

GSI utilizes both paper and electronic recording media on projects and implements document control procedures that are consistent with GSI and client-specific requirements. For instance, hand-recorded data records will be taken with indelible ink, and changes to such data records will be made by drawing a single line through the error with an initial by the responsible person. Similar controls are in place for electronic records. The PTL maintains ultimate responsibility for any and all changes to records and documents.

Each project is assigned a sequential job number. Project records and documents are filed by job number and by marking all materials with the appropriate job number. For hardcopy records, pertinent project records go into the job file, including work plans, data collection forms, work authorizations, laboratory reports, telephone logs, field activity reports, site safety plans and records, boring logs, correspondence, etc. Job files and records should be organized into one of six categories. Table 2 details the file categories that should be maintained during and after the completion of a project.

Table 2

GSI Job File Categories

Category	Description
Proposals/Work Orders	Includes job proposals, estimated job costs spreadsheet, purchase order, scope change requests, and correspondence related to clarification of project budget. Also includes work orders to subcontractors.
Deliverables/Documents	Includes reports, letter reports, and other deliverables specified in the proposal. For bound reports filed on shelving, the job folder should contain, at a minimum, the title page, table of contents, and transmittal or cover letter, indicating to whom the document was distributed. Please note that obsolete drafts of documents are to be removed and discarded from the project file and from electronic storage.

Category	Description
Correspondence	Includes written correspondence (excluding project deliverables) between GSI, client, and/or third parties related to the project.
Notes	Includes phone notes, meeting notes, notes to file, and other miscellaneous project-related notes.
Field Records/Safety Records	Includes final signed copy of project Health and Safety Plan, daily site safety records, daily activity reports, and other daily field records. For large file projects, types of field records may be separated by type at the discretion of the project manager. Equipment use forms will be retained in the project invoicing file maintained in the accounting office.
Miscellaneous	Item not fitting any of the descriptions above.

5.3 Document Retention

When office storage capacity is exceeded, job files will periodically be moved to offsite storage. Project files will be retained a minimum of three years from the conclusion of the project. Prior to discarding any batches of project files, a memo will be circulated to allow PTLs to designate that specific project files be retained.

The following GSI guidelines should be considered when creating or determining whether to retain internal project documents (e.g., meeting notes, phone notes, emails, other miscellaneous notes, internal memos, etc.). These guidelines apply to both handwritten and electronic project documents.

- Use common sense.
- Only create or retain documents that serve a clear function as part of the project record
- Cite substantiating references whenever appropriate.
- Permanent project documents should be written and filed in an easily understood manner.
- Circulation of project documents will be limited to those individuals working on the project who will need the document as part of their work on the project.

As a general rule, many project emails and other notes are working documents that support the development of a final project report. Accordingly, project emails or other notes should not be retained unless they provide supporting information that is not otherwise included in the final report, computer job file, or project file.

5.4 Computer Job Files

GSI's quality system requires that all computer job files are stored on the GSI server, which is backed up daily. Employees who submit a final copy of anything should transfer the document(s) to the central repository. All electronic documents should have the job number in the file name and be filed in the appropriate folder(s). When a FINAL report is issued, any DRAFT copies should be replaced in the paper archive and the computer archive with the updated FINAL copy. Each component of the document and other relevant information will be transferred to the central file.

6.0 COMPUTER HARDWARE AND SOFTWARE

GSI's computer hardware and software policy ensures that applicable EPA requirements for information resources management are addressed (EPA Directive 2100 [EPA 1998]), including security and privacy requirements. To ensure network security, compatibility, warranty coverage, and compliance with user licensing requirements, all computer hardware and commercial software for use on GSI work must be procured through GSI's Information Technology specialists.

GSI has developed an extensive portfolio of software tools designed to aid the environmental professional. Many of our innovative software products have been created in conjunction with federal and state agencies and are used by industry and government organizations worldwide. As a result, GSI values high quality in not only hardware but software requirements for project implementation, environmental data evaluations, modeling, process controls of environmental technology systems, and data analysis and database storage. GSI maintains a Network Administrator and Backup Network Administrator on staff as the point of contacts for assistance with computer related issues and software.

6.1 Roles and Responsibilities

Network Administrators

Network Administrators are responsible for procuring, developing, installing, testing, using/handling, maintaining, controlling, and documenting computer hardware and software to ensure they meet technical and quality requirements and directives. Network Administrators act as the points-of-contact for all purchase orders for software and hardware to ensure they meet GSI requirements and comply with applicable contractual requirements and standards. After purchase of software and hardware, Network Administrators continue to assess and document the impact of changes to use requirements and/or performance to provide assistance and/or upgrades, as required.

7.0 PLANNING AND SCHEDULING

GSI has a systematic planning system for the collection of data and information to ensure the quality and quantity of information gathered complies with project objectives. This framework promotes communication among all organizations and individuals involved in the environmental program. Through this systematic planning process, the project team can develop acceptance or performance criteria for the quality of the data. The steps for the systematic planning process are outlined below and are the responsibility of the PTL.

- Identify the project schedule, resources, budget, milestones, and requirements
- Describe the project objectives
- Identify the type of data needed
- Identify constraints to data collection
- Determine the quality and quantity of the data needed
- Describe how, when, and where the data will be obtained
- Specify QA/QC activities to assess the quality performance criteria
- Describe methods for data analysis, evaluation, and assessment against the intended use of the data and the quality performance criteria

8.0 IMPLEMENTATION OF WORK PROCESSES

The GSI Standard Project Team Structure ensures the implementation of project tasks and objectives, and that required data and information is collected and processed in accordance with applicable project quality objectives. In accordance with project and contracting requirements, further breakdown of roles and responsibilities will be performed. These assigned roles include, but are not limited to, Quality Control Managers, Health and Safety Managers, and Field Team Leaders.

Principal
Responsible for overall project oversight, including scope and budget approval, contract execution, invoice review, staff assignments, technical guidance, and quality control oversight on draft and final reports. The Principal is also responsible for ensuring compliance with federal, state, and local regulations, and industry contract requirements and establishing management systems and logistics.

Project Team Lead
The PTL is responsible for scope and budget development, proposal preparation, subcontract and contract processing, project work orders, budget tracking, day-to-day project direction, client interface, data evaluation, draft and final report preparation, and project file creation and maintenance.

Project Team Staff (Field Quality Control, Field Team, Technical Advisors, Health and Safety)
The project staff provides technical and administrative expertise, including completion of each assigned project task. They assist in the development and implementation of site-specific Health and Safety Plans, work plans, and field activities.

9.0 ASSESSMENT AND RESPONSE

The GSI Project Principal is responsible for ensuring that the quality system for a given project is suitable to achieve project goals, and that the quality assessment program is implemented in a manner to ensure that those goals are met. The following assessment tools, as applicable, may be utilized for this purpose: quality system audits, management systems reviews, peer reviews, technical reviews, performance evaluations, data quality assessments, readiness reviews, technical systems audits, and surveillance. Suitability and quality assessment reviews include the following processes:

- Assessing the adequacy of the quality system at least annually;
- Planning, implementing, documenting and reporting assessment results to management, including how to select an assessment tool, the expected frequency of their application to environmental programs, and the roles and responsibilities of assessors;
- Determining the level of competence, experience, and training necessary to ensure that personnel conducting assessment are technically knowledgeable, have no real or perceived conflict of interest, and have no direct involvement or responsibility for the work being assessed;
- Ensuring that personnel conducting assessments have sufficient authority and access to programs, managers, documents, and records, as well as the organizational freedom to:

  – Identify both quality problems and noteworthy practices,

  - Determine the root cause(s) of deficiencies or other problems,
  - Propose recommendations for resolving quality problems, and
  - Independently confirm implementation and effectiveness of solutions;
- Ensuring management's review and response to findings;
- Identifying how and when corrective actions are to be taken in response to the findings of the assessment, ensuring corrective actions are made promptly, and confirming the implementation and effectiveness of any corrective action; and
- Addressing any disputes encountered as a result of assessments.

Results of the assessment process will be shared with the project team and subcontractors, as necessary. If any changes to the quality system are required, the GSI PTL will be responsible for any corrective actions.

10.0 QUALITY IMPROVEMENT

Continuous quality improvement leads to the development of a better and more responsive quality system. At GSI, each employee is encouraged to provide feedback to the Principal and PTL regarding quality improvements. Meetings are held with technical staff and may include the representatives from stakeholders and/or contractors to exchange ideas and identify new ways to accomplish tasks and produce better products. GSI PTLs are responsible for ensuring that ideas and recommendations for improvement in the QA process are captured and documented. The Principal is responsible for ensuring that recommended program changes are given due consideration, and if acceptable, approved and implemented.

For individual projects, the PTL is responsible for reviewing on an on-going basis and ensuring that all recommended changes are integrated into the QA process. Any significant new additions or changes in the QA process must be recorded, as appropriate, and incorporated into the QMP or project-specific QAPPs, as applicable.

The PTL and Technical Staff identify adverse conditions or concerns on an on-going basis. After considerations and discussions, corrective actions are implemented immediately. Corrective actions will identify the causes of the problem(s), determine if the problem(s) is (are) unique or have more generic implications, and recommend procedures to prevent reoccurrence of identified problems. The Project Principal is responsible for ensuring that corrective actions have been implemented and are effective in preventing reoccurrence of any additional problems.

If standard operating procedures need revision, the appropriate procedure will be rewritten and shared with impacted staff members. If necessary, additional QA training will be scheduled.